

REMARKS

Applicant has secured a one month extension of time to respond to the Office Action and encloses the fee of \$130 for this extension of time, thereby extending the due date to May 16, 2009.

Amended claim 1 includes all the features of original claims 1, 3, and 8.

The amended claim 36 includes the features of the original claims 36, 38 and 43.

As far as the original claims 1, 3 and 8 are concerned (now included in the amended claim 1), the Examiner had mainly cited against these claims US2003/0077478 A1 (Dani and US 7,144,624 B2 (Knowles).

First of all, we would like to draw the Examiner's attention to the fact, that US 7,144,624 B2 (Knowles et al) was apparently published on December 5, 2006, which is after the priority date (June 17, 2003) of this application.

It is an essential feature of the invention, that the thermally conductive material or mass or the organic matrix of this mass is in viscous or liquid state already at room temperature, that means at a temperature between 10 and 30°C, and that therefore the intermediate layer formed by this viscous mass is not a "gasket" as taught by US 7,144,624B2 or also by US 2003/0077478 A1.

US 2003/0077478 A1 teaches a thermal interface material with a visco elastic polymer matrix having a melting temperature between 60°C and 300°C or 118°C or 139°C or 217°C or between 60°C and 140°C or between 145°C and 165°C (compare section [0017] of US 2003/0077478 A1). This means, US 2003/0077478 A1 does not teach a thermally conductive material or mass the organic matrix of which is already in a viscous or liquid state at room temperature or at a temperature between 10°C and 30°C. Also, US 7,144,624 B2 does not teach an organic matrix which is already the viscous or liquid state at room temperature, but a "gasket" (compare for example column 3, line 47 of US 7,144,624 B2).

The Examiner is correct in stating that US 2003/0077478 A1 (Dani et al) does not disclose the length of at least a majority of the nanofibers embedded in the organic matrix is between 1-100µm and also (Dani et al) does not disclose the surface pressure against the intermediate layer being between approximately 0.1 and 100 bar.

The length of the nanofibers claimed in claim 1 as well as in claim 36 is a very essential feature of the invention, as in view of the roughness of the surfaces of the heat source as well as of the heat sink, the majority of the nanofibers embedded in the matrix must have t his length, in order to make sure, that at least a plurality of the nanofibers bridge the gap in between

the heat source and the heat sink, in order to provide for the intended improved thermal conductivity.

Furthermore, the pressure in the range of 0.1 and 100 bar is also a very essential feature. This provides for the required contact of the nanofibers with the surfaces of the heat source and the heat sink.

In order to obtain the liquid or viscous state for the thermally conductive material or mass and to keep also the thermal conductivity as high as possible, it is also essential, that the amount of nanofibers is in the range of 5 to 20 percent by weight (compare original claim 8). If the amount of nanofibers in the matrix is lower than 5 percent by weight, the thermal conductivity will be very poor. If the amount of nanofibers in the matrix is above 20 percent by weight, the thermally conductive material or mass will lose its viscosity and will harden, so that even with the pressure in between 0.1 and 100 bar only a very poor thermal conductivity between the heat source and the heat sink will be obtained.

The art does not teach the combination of all these essential features of the new claims 1 and 36 and the art does not especially teach that an improved thermal conductivity is obtained by the combination of these features in spite of the roughness of the surfaces of the heat source and heat sink.

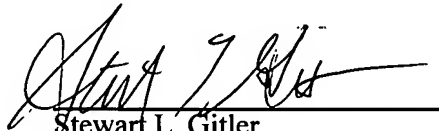
As far as the amount of nanofibers in the matrix is concerned (original claim 8), the Examiner had referred to section [0016] of US 2003/0077478 A1. Apart from the fact, that an amount of 5 to 20 percent by weight is not mentioned in this passage, this paragraph refers to the amount of thermal interface material 10 and not to the amount of nanofibers. The thermal interface material includes the visco elastic polymer matrix material, fusible solder particles and filler particles (section [0013]), that means the amount of solder particles 18 mentioned in section [0016] does not mean the amount of nanofibers.

Reconsideration of the refusal to approve the claims, as amended, is respectfully requested.

Respectfully submitted,

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Date



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